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Final Report on ADP (1990) Grant : NAG 5 1697

P.I.: R. E. Griffiths

The Grant has been used to support the correlation of Einstein and ROSAT Deep Survey data with optical and radio images of the same fields. The initial work in this program concentrated on the Einstein Deep Survey field in Pavo, where the deepest Einstein survey was performed, and where deep optical images have also been obtained at the Anglo-Australian Telescope, as well as radio data from the Australia Telescope. Finally, a correlation has been made between ROSAT X-ray images and corresponding optical CCD data to search for evidence that galaxies contribute to the X-ray background.

The method of "stacking" the X-ray data on optically-selected samples was employed, a method first used in radio astronomy to detect faint classes of objects. Although each optical object is not detected individually in the X-ray data, when the X-ray data are summed at the appropriate positions, then the sum may result in a significant detection of the whole class. This method was first demonstrated using the UV-excess active galactic nuclei in the Pavo field which were not detected individually - it was shown that the group as a whole resulted in significant detection. Similarly, objects selected by prism-survey also resulted in a significant detection in the stacked image. Galaxies were selected from CCD images of the center of the Pavo field obtained at the AAT, and these were also used to search for a positive detection in the stacked image. The central part of the field was too small to contain galaxies that were bright enough for a summed detection, but a stacked image of galaxies colour-selected from AAT prime-focus plates showed evidence of positive detection of blue galaxies.

Likewise, a correlation between a 30Ksec ROSAT X-ray image and the corresponding optical image has shown positive evidence that some of the extragalactic background originates in star-forming and other galaxies.

The following publications resulted from work performed under this Grant:

1992 The ROSAT Autocorrelation Function of the X-ray Background, (I. Georgantopoulos, G. Stewart, R. Griffiths, T. Shanks, and B. Boyle), *Proc. Workshop on AGN and the X-ray Background*, (Garching, Nov. 1991), *in press*.

1992 Active and Passive X-ray Galaxies in Deep ROSAT Surveys, (R. E. Griffiths, T. Shanks, B. J. Boyle, G. C. Stewart, I. Georgantopoulos), *Mon. Not. R. astr. Soc.*, *in press*.

1992 Correlations of Low-level Fluctuations in the X-ray Background with optically-selected AGN and galaxies, (Tolstoy, E., Griffiths, R. E., and Ewald, S. P. E.), *in preparation*

1992 Correlations Between Low-level Fluctuations in the X-ray Background and Faint Galaxies, (Tolstoy, E., and Griffiths, R. E.), in *Proc. Third Teton Summer School "Evolution of Galaxies and Their Environments"*

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